

We claim:

1. A molecular conjugate comprising a monoclonal antibody that binds to human antigen presenting cells (APCs) linked to β human chorionic gonadotropin (β hCG).
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2. The molecular conjugate of claim 1, wherein the antibody binds to a C-type lectin expressed on human dendritic cells.
3. The molecular conjugate of claim 1, wherein the antibody binds to the human mannose receptor.
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4. The molecular conjugate of claim 1, wherein the antibody is selected from the group consisting of human, humanized and chimeric antibodies.
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5. The molecular conjugate of claim 1, wherein the antibody is selected from the group consisting of a whole antibody, an Fab fragment and a single chain antibody.
6. The molecular conjugate of claim 1, wherein the conjugate is a recombinant fusion protein.
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7. The molecular conjugate of claim 1, wherein the antibody comprises a human heavy chain variable region comprising FR1, CDR1, FR2, CDR2, FR3, CDR3 and FR4 sequences and a human light chain variable region comprising FR1, CDR1, FR2, CDR2, FR3, CDR3 and FR4 sequences, wherein:
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 - (a) the human heavy chain variable region CDR3 sequence comprises SEQ ID NO: 15, and conservative modifications thereof; and
 - (b) the human light chain variable region CDR3 sequence comprises
30 SEQ ID NO: 18, and conservative modifications thereof.
8. The molecular conjugate of claim 7, wherein the human heavy chain variable region CDR2 sequence comprises SEQ ID NO: 14, and conservative modifications thereof; and the human light chain variable region CDR2 sequence
35 comprises SEQ ID NO: 17, and conservative modifications thereof.
9. The molecular conjugate of claim 7, wherein the human heavy chain variable region CDR1 sequence comprises SEQ ID NO: 13, and conservative

modifications thereof; and the human light chain variable region CDR1 sequence comprises SEQ ID NO:16, and conservative modifications thereof.

10 10. The molecular conjugate of claim 1, wherein the antibody
5 comprises:

 (a) a heavy chain variable region derived from a human VH5-51
germline sequence (SEQ ID NO:30); and

 (b) a light chain variable region derived from a human Vk-L15 (SEQ
ID NO:32) germline sequence.

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 11. The molecular conjugate of claim 1, wherein the antibody
comprises human heavy chain and human light chain variable regions comprising the
amino acid sequences shown in SEQ ID NO:4 and SEQ ID NO:8, respectively, or an
amino acid sequence that is sufficiently homologous to SEQ ID NO:4 or SEQ ID NO:8
15 such that the antibody retains the ability to bind to human dendritic cells.

 12. A molecular conjugate comprising a human antibody heavy chain
and a human antibody light chain, wherein either or both chains are linked to β hCG.

20 13. The molecular conjugate of claim 12, wherein the heavy chain is
linked to β hCG and comprises the amino acid sequence shown in SEQ ID NO:2.

 14. The molecular conjugate of claim 12, wherein the light chain
comprises the amino acid sequence shown in SEQ ID NO:6.

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 15. A molecular conjugate comprising a monoclonal antibody that
binds to human antigen presenting cells (APCs) linked to β human chorionic
gonadotropin (β hCG), wherein the antibody comprises:

 (a) a heavy chain variable region derived from a human VH5-51
30 germline sequence (SEQ ID NO:30); and

 (b) a light chain variable region derived from a human Vk-L15 (SEQ
ID NO:32) germline sequence.

 16. A molecular conjugate comprising a human single chain antibody
35 that binds to human antigen presenting cells (APCs) linked to β human chorionic
gonadotropin (β hCG), wherein the conjugate comprises the amino acid sequence shown
in SEQ ID NO:12.

17. The molecular conjugate of of claim 1 which is internalized and processed by APCs, such that a T cell-mediated immune response is generated against the antigen.
- 5 18. The molecular conjugate of claim 17, wherein the T cell response is mediated by cytotoxic T cells.
19. The molecular conjugate of claim 17, wherein the T cell response is mediated by both CD4⁺ and CD8⁺ T cells.
- 10 20. The molecular conjugate of claim 17, wherein the T cell response is induced through both MHC class I and MHC class II pathways.
21. A composition comprising the molecular conjugate of claim 1 and
15 a pharmaceutically acceptable carrier, optionally in combination with an adjuvant.
22. A method of inducing or enhancing a T cell-mediated immune response against β hCG, comprising contacting the molecular conjugate of claim 1 with APCs such that the antigen is processed and presented to T cells in a manner which
20 induces or enhances a T cell-mediated response against the antigen.
23. The method of claim 22, wherein the T cell response is mediated by both CD4⁺ and CD8⁺ T cells.
24. The method of claim 22, wherein the T cell response is mediated
25 by cytotoxic T cells and/or helper T cells.
25. The method of claim 22, wherein the T cell response is induced by cross-presentation of the antigen to T cells through both MHC class I and MHC class
30 II pathways.
26. The method of claim 22, wherein the β hCG antigen is expressed by a tumor cell.
- 35 27. The method of claim 26, wherein the tumor cell is selected from the group consisting of colon, lung, pancreas, breast, ovary, and germ cell derived tumor cells.

28. The method of claim 22, wherein the molecular conjugate is contacted with the dendritic cells *in vivo*.

29. The method of claim 22, wherein the molecular conjugate is
5 contacted with the dendritic cells *ex vivo*.

30. The method of claim 22, further comprising contacting the dendritic cells with a cytokine which stimulates proliferation of dendritic cells, optionally GM-CSF or FLT3-L.
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31. The method of claim 22, further comprising contacting the dendritic cells with an immunostimulatory agent, optionally an antibody against CTLA-4.
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32. A method of immunizing a subject comprising administering a molecular conjugate of claim 1 in combination with an adjuvant, a cytokine which stimulates proliferation of dendritic cells or an immunostimulatory agent.

33. A method of inducing or enhancing a cytotoxic T cell response
20 against an antigen comprising:
forming a conjugate of the antigen and a monoclonal antibody which binds to antigen presenting cells (APCs); and
contacting the conjugate either *in vivo* or *ex vivo* with APCs such that the antigen is internalized, processed and presented to T cells in a manner which induces or
25 enhances a cytotoxic T cell response against the antigen.

34. The method of claim 33, which further induces or enhances a helper T cell response against the antigen.

35. The method of claim 33, wherein the T cell response is mediated by both CD4⁺ and CD8⁺ T cells.
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36. The method of claim 33, wherein the T cell response is induced through both MHC class I and MHC class II pathways.
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37. The method of claim 33, wherein the antibody binds to a C-type lectin expressed on human dendritic cells.

38. The method of claim 33, wherein the antibody binds to the human mannose receptor.
39. The method of claim 33, wherein the antibody is selected from
5 the group consisting of human, humanized and chimeric antibodies.
40. The method of claim 33, wherein the antibody is selected from the group consisting of a whole antibody, an Fab fragment and a single chain antibody.
41. The method of claim 33, wherein the antibody comprises a human
10 heavy chain variable region comprising FR1, CDR1, FR2, CDR2, FR3, CDR3 and FR4 sequences and a human light chain variable region comprising FR1, CDR1, FR2, CDR2, FR3, CDR3 and FR4 sequences, wherein:
- (a) the human heavy chain variable region CDR3 sequence comprises
15 SEQ ID NO: 15, and conservative modifications thereof; and
- (b) the human light chain variable region CDR3 sequence comprises SEQ ID NO: 18, and conservative modifications thereof.
42. The method of claim 41, wherein the human heavy chain variable
20 region CDR2 sequence comprises SEQ ID NO: 14, and conservative modifications thereof; and the human light chain variable region CDR2 sequence comprises SEQ ID NO:17, and conservative modifications thereof.
43. The method of claim 41, wherein the human heavy chain variable
25 region CDR1 sequence comprises SEQ ID NO:13, and conservative modifications thereof; and the human light chain variable region CDR1 sequence comprises SEQ ID NO:16, and conservative modifications thereof.
44. The method of claim 41, wherein the antibody comprises human
30 heavy chain and human light chain variable regions comprising the amino acid sequences shown in SEQ ID NO:4 and SEQ ID NO:8, respectively, or an amino acid sequence that is sufficiently homologous to SEQ ID NO:4 or SEQ ID NO:8 such that the antibody retains the ability to bind to dendritic cells.
45. The method of claim 33, wherein the antigen is expressed by a
35 tumor cell or a pathogenic organism.

46. The method of claim 33, wherein the antigen is selected from the group consisting of β hCG, Gp100, prostate associated antigen and Pmel-17.

5 47. The method of claim 33, further comprising contacting the dendritic cells with an adjuvant, a cytokine which stimulates proliferation of dendritic cells, or an immunostimulatory agent.

48. The method of claim 33, wherein the conjugate is administered *in vivo* to a subject.

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49. The method of claim 48, wherein the subject is immunized against the antigen.